

Dry weather prevailed from the 17th to the 29th, when general showers occurred. Timely forecasts of the showers were issued.—*I. W. Chne, District Forecaster.*

CHICAGO FORECAST DISTRICT.

One of the most severe storms of the month reached the middle Missouri Valley on the morning of the 12th. The wind blew with considerable force on Lakes Michigan and Superior on that day, but by the morning of the 13th the storm had lost energy. Storm warnings were ordered for the upper Lakes on the morning of the 12th. On the morning of the 23d a storm from the British Northwest Territory appeared over Lake Superior. Storm warnings were ordered in the morning, but the storm lost force during the night of the 23d. A storm that had moved eastward over the northern tier of States passed over the upper Lake region on the morning of the 26th. Southwest storm warnings were ordered on the morning of the 25th and changed to northwest on the morning of the 26th. The storm caused high winds in the upper Lake region.

Frost warnings were ordered on several days, and they were generally verified. Although the frosts were quite severe, it is thought that in many parts of the corn belt no damage was caused. The cranberry growers of Wisconsin received warnings in advance, and where a water supply was available for flooding no injury resulted.—*H. J. Cor, Professor and District Forecaster.*

DENVER FORECAST DISTRICT.

Warnings were issued on the morning of the 12th for the first cold wave of the season, with freezing temperatures in the high districts of western Colorado and southern Utah. The light and heavy frosts of the month were covered by forecasts and warnings that were widely distributed.—*F. H. Brandenburg, District Forecaster.*

AREAS OF HIGH AND LOW PRESSURE.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocity.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
High areas.										
I.....	3, a. m.	53	122	9, a. m.	41	72	3,300	6.0	550	22.9
II.....	7, a. m.	41	124	11, p. m.	35	75	3,300	4.5	733	30.5
III.....	13, a. m.	51	114	12, p. m.	41	70	3,700	5.5	673	28.0
IV.....	14, a. m.	41	118	20, a. m.	45	64	4,400	7.0	628	26.2
V.....	22, a. m.	54	114	27, p. m.	46	60	4,300	6.0	717	29.9
VI.....	25, p. m.	47	123	29, p. m.	39	75	3,450	5.5	627	26.1
							2,875	4.0	719	30.0
Sums.....							25,325	38.5	4,647	193.6
Mean of 7 paths.....							3,618		664	27.7
Mean of 38.5 days.....									658	27.4
Low areas.										
I.....	4, p. m.	40	122	11, a. m.	48	54	4,000	6.5	615	25.6
II.....	6, p. m.	51	114	14, a. m.	48	54	2,850	4.5	633	26.4
III.....	10, a. m.	23	74	16, a. m.	33	82	1,275	4.0	319	13.3
IV.....	11, a. m.	39	109	14, a. m.	48	54	3,225	3.0	1,075	44.8
V.....	13, a. m.	26	65	16, a. m.	40	75	1,325	3.0	442	18.4
VI.....	14, p. m.	40	91	18, a. m.	50	64	1,900	3.5	543	22.6
	24, a. m.	51	120	29, a. m.	48	54	3,800	5.0	760	31.7
Sums.....							18,375	29.5	4,387	182.8
Mean of 7 paths.....							2,625		627	26.1
Mean of 29.5 days.....									623	26.0

For graphic presentation of the movements of these highs and lows see Charts I and II.—*George E. Hunt, Chief Clerk, Forecast Division.*

SAN FRANCISCO FORECAST DISTRICT.

In northern California very little rain fell. High wind velocities occurred at Point Reyes Light on the 12th and 13th and at coast points near San Francisco on the 23d. Reports from the Farallon Islands during the last half of the month were of great value to the shipping interests. The last decade of the month was marked by generally showery weather in southern California, and a marked disturbance over the Valley of the Colorado on the 27th was accompanied by showers in southern California that were forecast on the morning of the 27th.—*A. G. McAdie, Professor.*

PORTLAND, OREG., FORECAST DISTRICT.

No severe storms occurred. East of the Cascade Mountains light frosts were frequently reported during the last half of the month, and on the 30th generally in western Oregon. Heavy or killing frost was not reported except at a few exposed points. Warnings were issued in advance of the occurrence of each frost.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

Nothing of special interest transpired in the various river and flood districts during September, except the freshets in the Ocmulgee and Oconee rivers, description of which follows by Mr. John R. Weeks, Official in Charge of the Weather Bureau office, at Macon, Ga.

From St. Paul to St. Louis the mean stages of the Mississippi ranged from 2 to 3 feet higher than the preceding month, while from St. Louis southward to New Orleans they were somewhat lower. The waters of the Missouri, Ohio, Cumberland, and Tennessee continued to decline slowly, and with few exceptions, the lowest gage readings were reported on or about the last day of the month.

As a result of the tropical rainstorm which remained nearly stationary over the east Gulf States from the 13th to the 16th, inclusive, the danger lines were approximated in the lower stretches of nearly all the Alabama, Georgia, and South Carolina streams, but were reached at only a few places on the Ocmulgee and Oconee rivers, where timely warnings prevented any damage, except such as was unavoidable.

FRESHETS IN THE OCMULGEE AND OCONEE RIVERS.

Rains occurred in the above river district for the twenty-four hours ending at 8 a. m., September 15, 1903, as follows: Macon, 2.31 inches; Covington, 3.80 inches; Monticello, 2.44 inches; Atlanta, 1.92 inches; Gainesville, 2.26 inches; Milledgeville, 1.54 inches; Waycross, 1.80 inches; Eastman, 2.40 inches; Griffin, 5.42 inches; Athens, 2.42 inches; Beech Hill (to 2 p. m.), 3.62 inches. A bulletin and warning was therefore issued at 10 a. m., containing the following forecast:

"Rains continue to-day. The river at Macon will reach, and may exceed, danger line to-night and Wednesday. The Oconee will have a moderate rise but not to danger line."

This was sent to over three hundred addresses and was given by telephone, bulletin, and the local press to local and country addresses. Further rains occurred during the twenty-four hours ending at 8 a. m. the next day as follows: Macon, 1.10 inches; Greensboro, 2.10 inches; Washington, 1.50 inches; Milledgeville, 2.04 inches; Dublin, 2.02 inches; Athens, 1.98 inches; Augusta, 1.28 inches. Another bulletin was therefore issued to Oconee River interests, containing the following:

"A moderate freshet is indicated for the Oconee River which will cover medium lowlands and pass Dublin the last of the week."

The freshet in the Ocmulgee passed Macon September 17, with a stage not quite at the danger line, but it exceeded the danger line slightly at Abbeville on the 23d. Some damage was done to crops on lowlands, but other interests were fully prepared and sustained no damage.

The freshet in the Oconee passed Dublin September 20. The banks are high at that point and it did not reach the danger line, but some lowlands were covered, the damage being slight and unavoidable. These freshets were not as high as they would otherwise have been from the amount of rainfall had it not been for the excessive dryness of the soil. On the whole they were beneficial, as the warnings enabled lumbermen, boatmen, and rice planters to prepare for the higher water and take advantage of it in their work.

The highest and lowest water, mean stage, and monthly

range at 175 river stations are given in Table VII. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mis-

issippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock on the Arkansas; and Shreveport, on the Red.—*George E. Hunt, Chief Clerk, Forecast Division.*

CLIMATE AND CROP SERVICE.

By Mr. JAMES BERRY, Chief of Climate and Crop Service Division.

The following summaries relating to the general weather and crop conditions during September are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau; they are based upon voluntary reports from meteorological observers and crop correspondents, of whom there are about 3000 and 14,000, respectively:

Alabama.—Drought continued in northern and western counties; heavy to locally excessive rains and high winds damaged cotton, late corn, and cane in middle and southeastern counties during middle of month; light frost in some northern counties. Cotton opened rapidly, much of it prematurely; picking well advanced by close of month. Early corn matured well, promising good yield; late corn practically a failure. Minor crops fair. Much hay and fodder saved. Very little fall plowing or seeding done.—*F. P. Chaffee.*

Arizona.—The early part of the month was very warm, but moderate temperatures prevailed during the middle and latter portions. Over a large part of the Territory rains were quite well distributed throughout the month, and near the end there were good general rains. There was some damage to crops by frost in the northern part of the Territory, but elsewhere late crops did well. The late rains insured good grazing for stock on ranges.—*M. E. Blystone.*

Arkansas.—Cotton made little improvement owing to adverse weather conditions; it opened slowly and very little picking was done until the latter part of the month, and at the close only a small percentage had been picked; there was very little top crop and indications were for about two-thirds of an average crop. Late corn suffered for moisture; harvesting of early begun. Rains the last week of the month improved late potatoes, turnips, and pastures. Late apples scarce, quality inferior. Too dry for fall plowing.—*Edward B. Richards.*

California.—Weather conditions during almost the entire month were remarkably favorable for ripening fruits and grapes, as well as for fruit drying and raisin making. The rain in southern California on the 27th caused slight damage to beans and unprotected hay, but owing to ample warnings there was no material injury to raisins and drying fruits. High winds in the interior caused trifling damage to grapes and late fruits. Fires destroyed much valuable timber in the coast region.—*Alexander G. McAdie.*

Colorado.—Streams were about normal, but the water supply was inadequate throughout the month. Soil was dry and plowing difficult, although the rains prior to the middle of the month afforded some relief. From the 15th to the 17th severe cold weather was general. Of the staple crops corn on irrigated lands and late potatoes were slightly injured, but general truck suffered considerable loss. Harvest in higher districts was practically finished before the cold period, while thrashing continued throughout the month. Corn cutting and potato digging were well under way, along with harvest of winter vegetables and third crop of alfalfa, shortly after the cold period; ranges were fair, and stock did well.—*F. H. Brandenburg.*

Florida.—General crop conditions up to the commencement of the second decade were favorable. A hurricane crossed the south-central portion of the State on the 11th, and the western portion close to the Apalachicola River on the 13th. The heavy rains accompanying the hurricane were particularly damaging to gardens. The citrus crop suffered only moderately, and that from "thorning." Cotton was blown from the bolls, sanded, and the stalk badly whipped; much of it also sprouted. Timber which had been boxed was blown down. By the close of the month, however, crops had experienced more or less recovery from the damage inflicted by the storm.—*G. Harold Noyes.*

Georgia.—The temperature was below normal, but there were several days with excessive heat early in the month. The rainfall was below normal in the northern section, but was above the average elsewhere. The bulk of the precipitation occurred from the 13th to the 16th. Cotton was seriously damaged by drought and unseasonably cool nights; picking was active after the 10th, but the yield was regarded as below normal in quality and quantity.—*L. A. Judkins.*

Idaho.—Harvest was retarded and grain somewhat damaged by wet weather in northern counties. Weather generally favorable for rapid maturing of fruit in southwestern districts; packing and shipping of prunes nearly completed by the close of the month; some winter apples were harvested during the month.—*S. M. Blandford.*

Illinois.—Light to heavy frosts occurred on the 17th and 18th, but no serious injury to vegetation ensued. Rainfall in the northern district was excessive; in the central and southern districts, deficient; in the southern district the deficiency was pronounced. Except in the southern district, pastures maintained an excellent condition throughout the

month. Plowing progressed under favorable conditions, and considerable rye and wheat had been sown. By September 30 corn had matured beyond expectations, and the bulk of the crop was practically safe from injury by frost.—*Wm. G. Burns.*

Indiana.—Droughty conditions in south section and few counties of central section dried corn prematurely and delayed fall seeding. Light frost throughout State 17-18th did no material damage. Corn crop fair in south and good in north portions of State, practically all safe from injury by frost. Wheat sowing well advanced in central and north sections. Apple crop light and much of the fruit inferior. Potatoes yielding only a light to fair crop. Canning of corn and tomatoes completed in south section; crop fair; in other sections tomato vines continued green and the fruit ripened slowly.—*W. T. Blythe.*

Iowa.—Frost on several dates, with very small damage, except in limited areas. Fully 80 per cent of corn crop well matured at close of month and balance nearing maturity. Good progress made in harvesting minor crops and plowing. Potato crop materially hurt by rotting. Winter apple yield light. Second crop of hay unusually heavy, and pasturage extra good.—*John R. Sage.*

Kansas.—By the end of the month the early corn was ready to crib in the northern counties; late corn had ripened rapidly and the larger part of it was out of danger from frost. Haying had ended. Wheat sowing was finished in some counties and continued in others; much of the early sown wheat was up and presented a good stand. Kafir corn and cane were in good condition, but the larger portion of these crops was too green to cut.—*T. B. Jennings.*

Kentucky.—The temperature averaged considerably above the normal until the 16th, when it fell rapidly and continued quite cool during the remainder of the month. Light frosts were general on the 18th and 19th. Tender vegetables and late fields of tobacco were injured, but the extent of the damage was not great. A severe drought prevailed during the latter part of the month; late corn suffered severely, the sowing of winter wheat was stopped, pastures dried up, and water for stock became scarce in many places.—*H. B. Hersey.*

Louisiana.—Cotton suffered from the effects of unseasonably cool weather at different times during the month; rust, shedding, and premature opening caused injury to the crop in several places. The weather was favorable for picking, which, however, on account of the backwardness of the crop, did not become general until toward the middle of the month. About one-third of the crop had been picked by the close of the month. Dry, cool weather checked the growth of sugar cane, and, as a result, the stalk will be short. Rice harvest and thrashing made satisfactory progress and the yield is good. Corn was being housed in good condition. The weather has been too cool and dry for fall gardens.—*I. M. Cline.*

Maryland and Delaware.—The month was favorable for farm work. Wheat seeding was general last of month and early wheat already up in the west. Corn crop light and quality below average; larger part of crop was in shock by last of the month, but much late corn still green. Tobacco crop fair to good, but curing unsatisfactorily. Tomato crop good in east, light in north and west. Apples abundant and of good quality. Poor yield of late potatoes; considerable loss by rotting.—*Oliver L. Fassig.*

Michigan.—The month, as a whole, was unfavorable to the best maturing of corn, while the excessive moisture did great damage to potatoes by causing extensive blight of the vines and rotting of the tubers. The continued rains of the early part of the month spoiled some of the early beans, delayed the maturing of late beans and interfered with their harvest. Beans were much damaged and considerably discolored. Wheat and rye seeding progressed rather slowly, but germinated splendidly.—*C. F. Schneider.*

Minnesota.—The first half of the month was very wet, the rains of the 11th in the Minnesota Valley having probably been exceeded in amount but once in the past 30 years. The latter half of the month was dry until the general rains which began on the 29th. Light frost in northern and central portions on the 4th and 5th; freezing temperatures in northern and western portions on the 16th to 18th, and several light frosts in the latter part of the month; only the most tender vegetation seriously injured. Grain in shock and stack was still damp late in the month, but it was being thrashed where the ground was not too soft for machines to move. Potatoes were being dug, but they were rotting badly. Considerable plowing done.—*T. S. Outram.*

Mississippi.—Owing to the cool and very dry weather cotton deteriorated rapidly throughout the month; rust, shedding, and premature opening was very damaging; boll worms were quite destructive in portions of the delta; picking was in full progress, the yield being below the average. Corn was being gathered, the early yielding well and the late fairly good. Large yields of forage crops were secured in splendid condition.